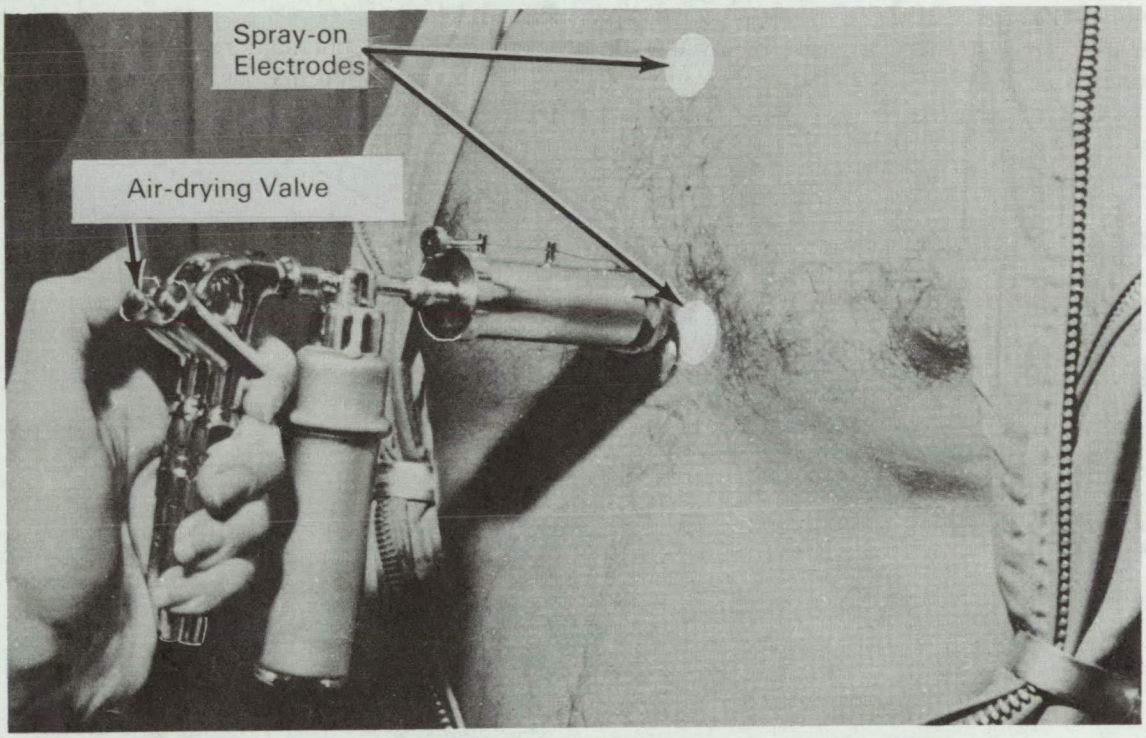
December 1966 Brief 66-10649

NASA TECH BRIEF

Spray-On Electrodes Enable ECG Monitoring of Physically Active Subjects



The problem:

To devise ECG (electrocardiagram) electrodes that can be easily applied to the skin of human subjects and will permit their heart signals to be monitored while they are engaged in various physical exercises.

The solution:

Electrodes formed from an air drying, electrically conductive cement mixture that can be applied to the skin by means of a modified commercially available spray gun.

How it's done:

The conductive cement from which the electrodes are formed consists of a mixture of a commercially available household cement, silver powder, and acetone. The spray gun is a modified atomizer assembly with two valves and a one-ounce glass container for the liquid cement mixture. A special barrel with a slit tab on the end holds an electrode lead which is disengaged by a spring loaded release rod. The barrel confines application of the conductive cement mixture to a circular area of half-dollar size. A T-connector is incorporated to enable use of one air hose instead

(continued overleaf)

of two. The two valves permit sequential use of liquid spray for electrode application and air for drying. Normally, an air pressure of 20 pounds per square inch is adequate.

Before the electrodes are applied, the selected skin areas are cleaned with an electric toothbrush and electrode jelly. Residual jelly is then removed with a clean, dry sponge, and a thin film (1/2-inch diameter) of fresh jelly is wiped onto the prepared skin area. The conductive cement mixture is sprayed over the jelly film to capture an end of the lead wire and to form a half-dollar-size electrode on the skin. The electrode is finally air dried and coated with a commercially available insulation cement released from an aerosol can.

Notes:

1. Application of the electrodes does not require shaving of the skin.
2. After use, the electrodes are easily removed with acetone.
3. Further information concerning this invention is given in Flight Research Program–III, High Impedance Electrode Techniques, by James Roman, M.D., *Aerospace Medicine* Vol. 37, No. 8, August 1966 and in NASA TN D-3414, "Dry Electrodes for Physiological Monitoring" by Charles W. Patten, Frank B. Ramme, of Spacelabs, Inc., and James Roman of Flight Research Center, May 1966. TN D-3414 is available from the Clearinghouse for Federal Scientific and Technical Information, Springfield, Virginia 22151. Inquiries may also be directed to:

   Technology Utilization Officer
   Flight Research Center
   P.O. Box 273
   Edwards, California 93523
   Reference: B66-10649

Patent status:

Inquiries about obtaining rights for the commercial use of this invention may be made to NASA, Code GP, Washington, D.C. 20546.

Source: (FRC-36)